

				Comet R. A.			Comet Decl.			
				h	m	s	°	'	"	
1867, June	1	10	32	23	60	15	4	2	86	— 6 3 56.95 5
	2	10	57	2	55	15	4	23	78	— 6 29 8.40 3

June 1. Exceedingly faint, difficult observation ; comparison star, W. B. *Hora* 14, No. 1155.

June 2. Steady night, observations fair ; comparison star, W. B. *Hora* 14, No. 1085.

Mr. Barclay's Observatory,
Leyton, Essex.

Jupiter without his Satellites. By C. Leeson Prince.

Aug. 21st, 1867. In the early part of this evening, such heavy clouds were spread over the sky, from the zenith to the south-east horizon, that small hope could be entertained of seeing the interesting phenomenon of the planet *Jupiter* divested of his satellites. At 9^h 26^m L. M. T. I first saw the planet through a gap in the clouds after the disappearance of the second satellite, and before the appearance of the fourth satellite, upon *Jupiter's* disk. The atmosphere at this time was in such a state of tremor, that although I watched the fourth satellite coming up to the planet's limb, yet I could not even estimate the time of immersion. However, at 9^h 35^m, it was fairly upon the disk, and appeared as a round *black* spot, its colour being as nearly as possible that of its own shadow, and very nearly equal to that of the third. The shadow of the fourth was decidedly irregular, larger than the satellite itself, and I thought slightly elongated towards the north-west. The third satellite was of a dark grey colour, and certainly less dark, than I had often seen it. At 9^h 40^m the planet was obscured by clouds, and I could not see it again till 10^h 20^m, when the first satellite and its shadow had appeared upon the scene, and consequently *Jupiter* was completely shorn of his satellites. About this time I could discover scarcely a shade of difference between the colour of the fourth satellite and its shadow and that of the first and third; the shadow-spot of the third being perhaps a little darker. At eleven o'clock the definition very much improved, and I was able to take a sketch of the phenomenon with tolerable accuracy. The belts were very well defined, and at intervals the northern edge of the southern belt appeared beautifully lit up, much resembling in miniature the edge of a cumulo-stratus cloud, when the sun is shining upon it. There were also two conspicuous indentations along this edge of the belt. I obtained frequent glimpses of the first satellite during its transit, and it commenced shining much brighter than the

body of the planet 18 minutes before emersion; the third commenced shining as brightly as usual 14 minutes before emersion. Unfortunately a dense fog came on soon after 1 o'clock which prevented my seeing the emersion of the fourth.

In the *Monthly Notices* (vol. xx. p. 245) is an interesting letter from the Rev. W. R. Dawes, on the appearance of *Jupiter's* satellites while transiting the disk of the planet, in which he states, "That some of the satellites of *Jupiter*, while passing over the planet's disk appear as dark spots, is noticed by Sir John Herschel as having been *first* observed by Schröter and Harding; probably, therefore, some thirty or forty years ago; but it is not stated where their observations of the phenomenon were published." Upon the present occasion, therefore, I beg to call attention to the fact, that the phenomenon of the fourth satellite appearing as a dark spot upon the planet's disk was observed and recorded by Mr. J. Pound, 148 years ago. This observation may be found in vol. xxx. of the *Phil. Transactions*, or at p. 307 in the fourth vol. of their Abridgement by Henry Jones, M.A. As it is probable that many Fellows of the Society may not have ready access to these early vols. of the *Phil. Trans.*, I have copied Mr. J. Pound's communication to the Royal Society. It was as follows:—

"On the 16th of February, 1719, at 6^h, through a short tube, we saw all the four satellites, the three outermost on the east side of *Jupiter*, and the innermost near the western limb, approaching to an eclipse. The fourth at that time was about half a semi-diameter of *Jupiter* from the eastern limb. Then it proved cloudy till about 8^h, at which time (through the Huygenian telescope) we could see only the second and third satellites, the first being behind *Jupiter* in the shadow, and the fourth entered upon the disk. We saw at this time a dark spot a little northward of the greater zone, and near the eastern limb, where the satellite was to enter upon the disk; which spot we took for the shade of the satellite. The clouds then again intercepted our view, till 8^h 53^m Æq. T., at which time the first satellite was lately emerged out of the shadow, and the spot advanced so far, that we perceived it would arrive at the middle of *Jupiter*, near two hours sooner than the shade ought to have done by our computation; but not imagining, that this dark spot could be any thing else but the shade, we concluded there had been some error in the calculation, which we thought to re-examine afterwards. On this presumption we left off observing till 9^h 35^m, at which time we were surprised to see a notch in the limb of *Jupiter*, near the place where the former spot entered. This last appearance agreeing well with the time that the shade of the satellite ought to have entered the disk, soon made us alter our former opinion, and conjecture, that this, and not the other spot, was

the said shade. At $9^h 39^m$ $\text{\AA}q. T.$, the notch vanishing, a round black spot appeared within the limb, but in contact with it. At $9^h 45^m$ we judged the first spot, and at $11^h 45^m$ the second, to be in the middle of *Jupiter*. At $11^h 50^m$ the first spot touched the limb, being within the disk; soon after which the limb in that place seemed a little protuberant. At $12^h 5^m$ appeared the fourth satellite just come out of the disk, and touching the limb in the place where the protuberancy was. At $12^h 7^m$ we could perceive the satellite separated from the limb. At $13^h 56^m$ the second black spot, still within the disk, just notched the western limb; soon after which there appeared a notch in this part of the limb, as it did on the other at the coming on of this spot. At $14^h 6^m$ the spot was all gone off, and the limb appeared clean and entire. The first spot, when in the middle of *Jupiter*, was almost as black as the second when near the limb, but somewhat less and a little more northerly. At the time that the first spot was in the middle of the disk, the three innermost satellites appeared to the east of *Jupiter*; the first (as aforesaid) having lately emerged out of the shadow; the second being almost at its greatest distance; and the third having passed the axis of the shade about twelve hours before, and apparently at this time about three diameters of *Jupiter* from his limb. The times that these spots arrived at the middle of the disk are agreeable to the times found by calculation, in which the fourth satellite and its shade ought to have appeared there. From all which it is very plain, that the first of these spots was *the fourth satellite itself*, and the second its shadow. We have seen the first and second satellites appearing not as dark spots, but as bright ones (somewhat different from the light of *Jupiter*), for some little time after they have entered his disk, but as they approached the middle we lost sight of them. And we have frequently observed, that the same satellites appear brighter at some times than others; and that when one of them hath shined with its utmost splendour, the light of another hath been considerably diminished. From whence it is very probable, at least, not only that the satellites revolve upon their proper axis, but also that some parts of their surfaces do very faintly (if at all) reflect the solar rays to us. All which hath for some time since been observed and taken notice of by Messrs. Cassini and Miraldi, as may be seen in the *Memoirs of the Académie Royale*, for the years 1707 and 1714."

*Observatory, Uckfield,
Sept. 4th, 1867.*